What is claimed is:

1. A set of monomers capable of self assembling and forming a synthetic polymer complement "SPC"capable of binding a target, wherein the SPC has a diameter less than about 1000 nm, and wherein at least some of the monomers comprise:

at least one head group capable of undergoing a binding interaction with the target; and

at least one crosslinking group capable of covalently reacting to crosslink monomers of the monomer set, thereby to form the SPC, wherein head groups in the SPC are capable of a binding interaction with the target.

2. The set of monomers of claim 1, wherein at least some of the monomers comprise a head group, a crosslinking group and a tail region.

3. The set of monomers of claim 2, wherein the set of monomers further comprises monomers comprising a crosslinking group.

4. The set of monomers of claim 2, wherein the set of monomers further comprises a cosurfactant.

5. The set of monomers of claim 2, wherein, in at least some of the monomers, the head group is covalently attached to the tail region.

6. The set of monomers of claim 2, wherein, in at least some of the monomers, the crosslinking group is covalently attached to the tail region.

7. The set of monomers of claim 2, wherein at least some of the monomers are amphiphilic.

8. The set of monomers of claim 2, wherein at least some of the monomers comprise a carbohydrate moiety.

9. The set of monomers of claim 8, wherein the carbohydrate moiety is a dextran moiety.

10. The set of monomers of claim 8, wherein at least some of the monomers comprises a tail group covalently attached to the carbohydrate moiety.

11. The set of monomers of claim 1, wherein the set of monomers is capable of forming an SPC which is capable of binding about 1 to 20 targets.

12. The set of monomers of claim 1, wherein the set comprises about 2 to 50 different types of monomers.

13. The set of monomers of claim 2, wherein the tail region comprises a polymeric moiety selected from the group consisting of a poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone),

poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propyleneoxide) block copolymer, polysaccharide and a poly(amino acid).

14. The set of monomers of claim 2, wherein the tail region comprises a branched or straight chain saturated or unsaturated hydrocarbon moiety.

15. The set of monomers of claim 2, wherein the head group is selected from the group consisting of alcohols, carboxylic acids, amides, amines, phosphates, sulfonates, aromatic groups, sugars, disaccharides and polysaccharides.

16. The set of monomers of claim 2, wherein the crosslinking group is selected from the group consisting of acrylate, methacrylate, acrylamide, vinyl ether, epoxide, methacrylamide, vinylbenzene, α–methylvinylbenzene, divinylbenzene, maleic acid derivative, diene, substituted diene, thiol, alcohol, amine, carboxylic acid, carboxylic anhydride, carboxylic acid halide, aldehyde, ketone, isocyanate, succinimide, carboxylic acid hydrazide, glycidyl ether, silane, siloxane, chlorosilane, alkoxysilane, alkyne, azide, 2'-pyridyldithiol, phenylglyoxal, iodo, maleimide, aryl halides, imidoester, dibromopropionate, and iodacetyl.

17. The set of monomers of claim 2, wherein the target is an enzyme.

18. The set of monomers of claim 2, wherein some of the monomers comprise styrene, divinyl benzene and vinylbenzoic acid, and wherein the monomer set further comprises a cosurfactant.

19. A synthetic polymer complement ("SPC") having a diameter less than about 1000 nm and capable of binding a target, wherein the SPC is formed by:

providing a set of monomers, at least some of the monomers comprising at least one head group capable of undergoing a binding interaction with the target, and at least one crosslinking group capable of covalently reacting to crosslink monomers of the monomer set;

contacting the set of monomers with a target to permit the monomers to self assemble on the target; and

crosslinking monomers of the monomer set to form the SPC, wherein head groups in the SPC are capable of a binding interaction with the target.

20. The synthetic polymer complement of claim 19, wherein at least some of the monomers comprise a head group, a crosslinking group and a tail region.

21. The synthetic polymer complement of claim 19, wherein the set of monomers comprises monomers comprising a crosslinking group.

22. The synthetic polymer complement of claim 19, wherein the set of monomers further comprises a cosurfactant.

23. The synthetic polymer complement of claim 19, wherein at least some of the monomers are amphiphilic.

24. The synthetic polymer complement of claim 19, wherein at least some of the monomers comprise a carbohydrate moiety.

25. The synthetic polymer complement of claim 19, wherein the SPC is capable of binding about 1 to 20 targets.

26. The synthetic polymer complement of claim 19, wherein the set comprises about 2 to 50 different types of monomers.

27. The synthetic polymer complement of claim 19, wherein the tail region comprises a poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propyleneoxide) block copolymer, polysaccharide and a poly(amino acid) or a hydrocarbon moiety.

28. The synthetic polymer complement of claim 19, wherein the head group is selected from the group consisting of alcohols, carboxylic acids, amides, amines, phosphates, sulfonates, aromatic groups, sugars, disaccharides and polysaccharides.

29. The synthetic polymer complement of claim 19, wherein the crosslinking group is selected from the group consisting of acrylate, methacrylate, acrylamide, vinyl ether, epoxide, methacrylamide, vinylbenzene, α–methylvinylbenzene, divinylbenzene, maleic acid derivative, diene, substituted diene, thiol, alcohol, amine, carboxylic acid, carboxylic anhydride, carboxylic acid halide, aldehyde, ketone, isocyanate, succinimide, carboxylic acid hydrazide, glycidyl ether, silane, siloxane, chlorosilane, alkoxysilane, alkyne, azide, 2'-pyridyldithiol, phenylglyoxal, iodo, maleimide, aryl halides, imidoester, dibromopropionate, and iodacetyl.

30. The synthetic polymer complement of claim 19, wherein the target is an enzyme.

31. The synthetic polymer complement of claim 19, wherein the SPC further comprises the target associated with the SPC via binding interactions between the head groups of the SPC and the target.

32. The synthetic polymer complement of claim 19, wherein some of the monomers comprise styrene, divinylbenzene and vinylbenzoic acid, and wherein the monomer set further comprises a cosurfactant.

33. A composition comprising an SPC of claim 19 in a pharmaceutically acceptable carrier, wherein the target is an active agent.

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34. A method of making a synthetic polymer complement ("SPC") having a diameter less than about 1000 nm, wherein the SPC is capable of binding a target, the method comprising:

a) providing a set of monomers, wherein at least some of the monomers comprise at least one head group capable of undergoing a binding interaction with the target, and at least one crosslinking group capable of covalently reacting to crosslink the monomers, thereby to form the synthetic polymer complement;

b) contacting the set of monomers with a target to permit the monomers to self assemble on the target; and

c) reacting the crosslinking groups of the monomers, thereby to covalently crosslink monomers of the monomer set, to form SPCs having an average diameter less than about 1000 nm, wherein head groups in the SPC are capable of a binding interaction with the target.

35. The method of claim 34, wherein at least some of the monomers comprise a head group, a crosslinking group and a tail region.

36. The method of claim 34, wherein the set of monomers further comprises monomers comprising a crosslinking group.

37. The method of claim 34, wherein the set of monomers further comprises a cosurfactant.

38. The method of claim 34, wherein at least some of the monomers are amphiphilic.

39. The method of claim 34, wherein at least some of the monomers comprise a carbohydrate moiety.

40. The method of claim 34, wherein the SPC is capable of binding about 1 to 20 targets.

41. The method of claim 34, wherein the monomer set includes about 2 to 50 different types of monomers.

42. The method of claim 34, wherein the tail region comprises a poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propyleneoxide) block copolymer, polysaccharide and a poly(amino acid) or a hydrocarbon moiety.

43. The method of claim 34, wherein the head group is selected from the group consisting of alcohols, carboxylic acids, amides, amines, phosphates, sulfonates, aromatic groups, sugars, disaccharides and polysaccharides.

44. The method of claim 34, wherein the crosslinking group is selected from the group consisting of acrylate, methacrylate, acrylamide, vinyl ether, epoxide, methacrylamide, vinylbenzene, α–methylvinylbenzene, divinylbenzene, maleic acid derivative, diene, substituted diene, thiol, alcohol, amine, carboxylic acid, carboxylic anhydride, carboxylic acid halide, aldehyde, ketone, isocyanate, succinimide, carboxylic acid hydrazide, glycidyl ether, silane, siloxane, chlorosilane, alkoxysilane, alkyne, azide, 2'-pyridyldithiol, phenylglyoxal, iodo, maleimide, aryl halides, imidoester, dibromopropionate, and iodacetyl.

45. The method of claim 34, wherein the target is an enzyme.

46. The method of claim 34, wherein the method further comprises releasing the target from the SPC.

47. The method of claim 34, further comprising covalently linking the target to the SPC.

48. The method of claim 45, wherein prior to step b) the method comprises combining an aqueous solution comprising the enzyme with an organic solvent comprising a cosurfactant, thereby to form a reverse micelle having the enzyme solubilized therein; and

wherein step b) comprises contacting the set of monomers with the enzyme in the reverse micelle, to permit the monomers to self assemble on the enzyme.

49. The method of claim 34, wherein the target is an active agent and the SPC is capable of binding the active agent.

50. The method of claim 34, wherein some of the monomers comprise styrene, divinylbenzene and vinylbenzoic acid, and wherein the monomer set further comprises a cosurfactant.

51. The method of claim 34, wherein:

in step a), the set of monomers comprises some monomers that comprise at least one crosslinking group capable of covalently reacting to crosslink the monomers, thereby to form the synthetic polymer complement, and at least some other monomers that comprise at least one head group capable of undergoing a binding interaction with the target, and wherein the set of monomers further comprises a cosurfactant;

in step b) the set of monomers is contacted with the target to permit the monomers to self assemble on the target in an oil in water emulsion; and

in step c) the crosslinking groups of the monomers are reacted, thereby to covalently crosslink monomers to form SPCs having a diameter of about 5 nm to 400

nm, wherein head groups in the SPC are capable of a binding interaction with the target, and wherein the SPC comprises about 1 to 1000 binding sites for the target.

52. The method of claim 51, wherein the monomers comprising at least one crosslinking group comprise styrene and divinylbenzene, wherein the monomers comprising at least one head group comprise vinyl benzoic acid, and wherein the surfactant is hexadecyltrimethylammonium bromide.

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